

TOOTHACHE
CURED BY
THE ELECTRIC CAUTERY

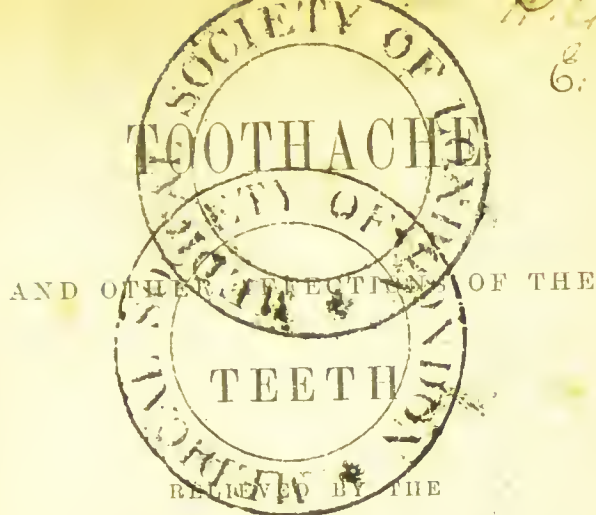


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For the Medical Society
of London, with
the author's respect-
ful compliments.

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ELECTRIC CAUTERY.

BY

THOMAS H. HARDING,

SURGEON DENTIST.

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The greater part of the following pages appeared in the *Lancet*; a desire having been expressed to see the matter in a separate form, has induced me to publish this little volume, which is submitted to my brethren of the Dental Profession.

T. H. H.

19, PARK SQUARE EAST,

REGENT'S PARK.

December, 1857.

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THE
ELECTRIC CAUTERY
AND
ITS APPLICATION TO DENTAL SURGERY.

It will be as well, at the commencement of the present essay, just to glance at the HISTORY of the introduction of the Electric cautery, and its general application in surgical practice. Crusell, of St. Petersburg, was the first to employ it for surgical operations, although his researches generally, on its use, were not published before the year 1846, yet his operations bear date anterior to those of any other surgeon.

In 1844, M. Louyet, of Brussels, recommended the operation for destroying the dental nerve; and in 1845, Heider, of Vienna, at the instigation of Steinheil, of Munich, cauterized the dental nerves with the galvanic cautery. In 1850, Mr. Marshall was the first to employ it in practical surgery in this country, but his researches were not published before 1851, when he brought the subject before the Royal Medical and Chirurgical Society in April of that year. In the same year I published a short paper on its use in dental surgery, being the first to adopt it in that special branch of surgery in this country; and in the same journal ("The Lancet"), a paper also appeared from Mr. Waite, recommending its use in dentistry.

Since 1851, it has been generally employed by others in England, France, and Germany.

Being deeply impressed with the great value of this powerful agent in many of the most deli-

cate operations which come under the hand of the general surgeon, from reading the papers communicated to the Medico-Chirurgical Society by my friend, Mr. Marshall, giving in detail an account of the manner in which he employed the heat of electricity for the purpose of limited cauterization in surgical disease, an abstract of which appeared in "The Lancet," in May, 1851; and again, a subsequent report of several operations performed by him, in which the results showed most satisfactorily the great value of this new agent, it struck me that its introduction into the practice of dental surgery would prove of inestimable value and of the greatest possible assistance, in effectually destroying the sensitive pulp of a decayed tooth, in a more certain, rapid, and safe manner than any of the numerous methods with which dentists are already familiar. I therefore conceived the idea, that a platinum wire, heated in the manner as recommended by Mr. Marshall, might be made avail-

able for the instantaneous destruction of an exposed tooth-pulp. I accordingly communicated my idea to Mr. Marshall, who fully concurred with me as to its importance. It had already suggested itself to his fertile mind, and had been mentioned by him as one of the obvious applications of his method of operating with the electric heat. His experience in this matter, moreover, enabled him to suggest for the purpose a very simple and suitable apparatus. which shall shortly be described.

In the first volume of "The Lancet" for 1851. there appeared a short communication from me on the destruction of the dental pulp by the heat of electricity, wherein I confidently stated that it might be regarded as a great advantage by all engaged in the practice of dental surgery. I had employed it for some months previous to the appearance of that paper, and fairly and justly claim to have been the first to use it in dental surgery in this country. In the same

number of that journal was described an instrument for applying heat in dental operations, by Mr. Waite ; but I had used it before the time mentioned by Mr. Waite, and moreover was not acquainted with his invention.

Now, other methods have been employed for applying heat to destroy the nerve of an aching tooth. The old village doctress has long been famous for curing toothache by the thrust of a hot needle or pin into the tooth, and dentists have occasionally used a heated wire. The actual cautery has long been a practice in vogue for the purpose of destroying the sensibility of the tooth-pulp from caries, and has been generally performed by heating a long piece of steel, small at one end, but terminating in a bulbous head about the size of a small pea, which is inserted into a handle. From the bulbous extremity projects a piece of platina wire, smaller or larger according to circumstances; the bulbous end being heated in an ordinary lamp until a

red or white heat is obtained, communicates the heat to the platinum wire, which is then immediately used for the purposes required. Another method of applying hot wires to the teeth is by means of platinum sponge and hydrogen gas, known as *Æropile* ; but I have had no experience of the use of this.

In regard to the use of the actual cautery, let us see what Mr. Snell says of it in his book on the teeth : he says, “ Even now, it (the destruction by the actual cautery) is frequently performed in an improper manner, which will account for the want of success which often attends it when attempted by ignorant men. As the operation is very generally performed, it would be more properly styled carbonizing the cavity of the tooth generally, then simply cauterizing the membrane.” It must be obvious to everyone that the great cause of failure, such as is here described, depends upon the difficulty experienced in obtaining a sufficient and per-

manent amount of heat; for it is well known that wire alone, which is the only substance sufficiently minute to be applied within the interior of a tooth, can retain the heat but for a very limited time. It is therefore necessary, in the hands of some dental surgeons, who are not satisfied with its effects, to apply it to the tooth certainly more than once, perhaps several times in succession. This must prove of serious injury to the teeth, as it will carbonize a large surface of the tooth generally, instead of cauterizing or destroying the tooth-pulp solely. Now all this is completely removed by the use of the electric cautery, which can never be surpassed for convenience and ready mode of application, besides possessing a steady, uniform, and constant degree of heat, which can be obtained at pleasure until the proper effects are obtained, and then as magically discontinued by destroying the connexion between the positive and negative wires. It has the advantage also, over every

other known method of cauterizing, that it can be introduced into the patient's mouth, and actually placed within the cavity of the tooth, before it is made to become incandescent,—an advantage that cannot be over-estimated by those conscientious dental surgeons who are so frequently called upon to destroy a tooth-pulp.

THE NATURE OF THE APPARATUS.

The nature of the apparatus which I am in the habit of using may be thus described. I shall speak of the battery first, and the cauterizer after :—

The BATTERY is a compound one of Smee's, and consists of six pairs of plates of zinc and platinized silver, contained in six cells, which are set in action by one fluid—viz., dilute sulphuric acid. The battery may of course vary

according to the choice and taste of the operator, but it is desirable to render it as elegant and as simple as possible. When I first employed the electric cautery, I used a battery of two pairs of plates in a single cell. I now prefer the larger battery of six cells, because a large battery with weak acid will last longer than a small one with strong acid; besides this, the action of the battery is more uniform, and lasts much longer. A Smee's battery is the most convenient of application; it is always clean, ready when wanted, and has the advantage moreover of cheapness. Grove's and Maynooth's batteries are not fitted for the purpose required, as they are troublesome, and often give out fumes of nitrous acid, which are decidedly objectionable.

The CAUTERIZER is thus constituted:—The terminal six inches of the poles, which are of copper wire plated, are supported on an ebony or ivory handle, upon the side of which one of

the poles is interrupted at a particular point. The extremities of the poles are connected by a piece of platinum wire, a hundredth of an inch thick, and three-quarters of an inch long, which is bent into a loop. The sides of the loop are then brought parallel and nearly close to each other, without touching, and it is thus introduced into the pulp cavity of the tooth to be operated on. By a slight pressure on one side of the handle, the interrupted pole is temporarily joined, and the platinum wire immediately becomes brilliantly heated, as it lies in contact with the tooth-pulp. Sometimes, however, I have found it desirable in the first place, to complete the galvanic current, and thus heat the platinum wire before bringing it to bear upon the exposed pulp. The flexibility of the loop of wire enables the operator to bend it in any direction previously to use. In this way I have succeeded in rapidly destroying the pulps of decayed and condemned teeth, and have pro-

ceeded, sometimes after a few minutes, to the operation of filling with gold, or with other suitable stoppings, as Ash's metallic paste. I use several cauterizers, with extremely thin wires, made expressly for myself by Coxeter, of Grafton-street, and Maddox, of University-street.

OF THE OPERATION IN GENERAL.

The affected tooth being carefully examined, its cavity is to be well-dried out and cleaned ; a soft napkin is then introduced, to protect the mouth from the possibility of contact with the instrument, the platinum point of which is passed into the cavity of the tooth, is then heated, and, from its brilliancy, gives a clear and distinct light, and the tooth-pulp is lightly touched with the heated wire, and the whole or particular portion of it required is destroyed. If the operator prefer it, he may have the wire

heated before introduction into the mouth, but my own practice is generally to apply the wire before doing this, and then permitting of incandescence to take place in the mouth, which gives a light which is not seen by the patient, and so well illuminates the interior of the tooth, as to permit the tooth-pulp or diseased membrane to be seen very distinctly and clearly.

There is some caution to be observed in the use of this agent, which it will be as well to mention, and that is, to void burning or otherwise injuring the solid part of the tooth; particular attention and care should be paid to this point. This will not happen unless the application is prolonged, which will very rarely indeed be required, if special care be observed to have the wire at a white heat. This is the more necessary to produce speedy destruction of the part to be touched, which is effected almost instantly. In one instance under my care, that of a lady for whom I nipped off the crown of an

incisor tooth, for the purpose of fixing some artificial teeth, and so exposed the pulp of that tooth, I applied the electric cautery at barely a red heat, owing to feebleness of the acid ; the consequence of this was, that the dental pulp became attached to the end of the wire, and was actually drawn out entirely. This has been preserved. It gave some slight pain for the moment, but nothing in comparison to the pointed steel or silver wire used by most dentists. This perhaps unimportant accident, I think, would not have occurred had the cautery been at a white heat, as it would then have completely carbonized or destroyed the part with which it came into contact.

The EFFECT of the operation is the rapid destruction of the pulps of the decayed and condemned tooth ; not the whole of the pulp for that is not always necessary, but that portion of it especially which is exposed. If this is done with a light, steady hand, no subsequent inflam-

mation is produced upon the substance of the tooth, or in the cavity. If there should be any marked sensitiveness in the tooth, independent of the pulp, the slightest application of the cautery to it will prove effectual in completely removing it. In the large number of cases in which I have employed the electric cautery I have never known any bad effects produced on the tooth, and this I attribute to the care with which it has been applied. I am, however, quite prepared to believe that a want of attention in this respect would not only prove injurious to the tooth, but even in many instances cause its destruction. It would be only under such circumstances that the operation could be attended with or followed by severe pain.

In whatever condition the tooth-pulp may be, the operation is associated with a little pain. But as the time of its application is not unfrequently just a second or so, in the large majority of instances in which I have employed it, there

has been no pain whatever felt. There may be a sort of twinge, which is but momentary ; and whatever pain may arise is not to be compared to that arising from the process of extracting a tooth, which, as is well known, is by no means free from a very considerable amount of pain. Some of my patients have felt so little when it has been applied, that they have asked me to apply it a second time to make all certain that the dental pulp has been effectually destroyed.

The SUBSEQUENT FILLING OF THE TOOTH is a matter which demands attention after the pulp is destroyed. If the cavity is examined very minutely, a small black speck or spot can be seen after the cautery has been used ; this is due to the carbonization of the pulp, and is a guide to some extent in the after process of removal of the carious portion of the tooth, which should always be done after the sensibility has been destroyed by the electric cautery, and is to be accomplished with care in the usual manner,

taking the precaution to leave none of the tooth in that condition remaining ; every particle of it should be removed. For a few days afterwards, sometimes only one, but generally two, the cavity is allowed to remain filled, with a combination of morphine and mastich, and then the tooth is stopped. Sometimes, again, I request my patients to allow a few days to elapse before I stop their teeth, the cavities being in the meantime filled with a solution of mastich and camphor. But I occasionally accomplish what I believe no other dentist has done, and that is, to plug, or stop the cavity in the same sitting during which the sitting has been destroyed. This, however, depends upon the complete absence of pain after the use of the cautery. I have already stated there is always a little pain, but sometimes this at once disappears, and I then do not hesitate to stop the teeth permanently. I also do this if there has been a little bleeding from the cavity previous to cauteriza-

tion, stopping the tooth immediately. It might be supposed this procedure of stopping the teeth immediately after the destruction of the pulp would be always followed by dull, aching pain ; but I am happy to say that not the slightest indication of pain has, in the great majority of instances, ensued, in rather an extensive use of this powerful agent.

As a rule, however, the tooth should not be stopped on the same day as the electric cautery has been applied, unless in the exceptional cases just mentioned—the removal of the carious portion not being followed by sensibility. Experience and practice teach us to know the proper cases which can be plugged immediately.

By waiting a day or two, I have found by experience also, that any sensibility remaining after the destruction of the dental pulp, and removal of the carious parts of the affected tooth, is sure to disappear, assisted by the solution of morphine and mastich, or mastich and camphor,

which occupies the cavity. By this time the cavity will bear the pressure of an instrument within it, and an examination will show that the destroyed pulp has receded considerably inwards ; this is apparent by noticing the black discolouration from the previous carbonization of the affected part, and as it is deeply situated, it is either out of the way of being pressed upon by the stopping of the tooth, or becomes a matter of the smallest possible importance, so far as my experience enables me to judge in this respect. I must, however, warn others not to mistake the black speck here referred to for actual caries.

Under the various circumstances which have been mentioned, the RESULTS of the operation are completely successful, and the teeth are serviceable for years. If, however, a tooth should remain tender after the use of the cautery, it is always better to wait for its complete disappearance before proceeding to stopping. I cannot

call to mind any single instance in which the pain was at all persistent after its use, but it will be sure to become so, if the tooth is one not fairly suitable for preservation, from being either loose or diseased at the termination of a fang, such as a small fungous growth, or other similar cause. In such cases, as I will shortly show, the destruction of the tooth-pulp, accomplished no matter by what method, will prove unavailing and unsatisfactory, ultimate extraction in such instances proving the only resource. Should there be associated inflammation of the gums with a carious tooth, in which the pulp has been destroyed in the manner which has been recommended, then the usual means for combating it must be resorted to, such as a leech or two to the gum, and repeated fomentations with warm water alone, as I am in the habit of recommending, or with warm milk and water, or a poultice. For the pain in the tooth itself, morphine and mastich will be found quite sufficient.

Some patients express the receipt of immediate relief after the use of the cautery ; others, again, not for an hour or two, but eventually they are quite relieved : the pain, however, I repeat, is extremely slight.

In the large number of cases in which I have used the electric cautery to destroy the sensitive tooth-pulp, I have not known an ACCIDENT, in the true sense of the word, to happen, unless I should except the case in which the dental pulp was suddenly drawn out attached to the platinum wire, which I have preserved for illustration, and depending upon, as has been said, the wire being at a red instead of a white heat. Such a circumstance might occur again in the hands of others. To avoid injury or accidents to the teeth or gums, it is necessary to keep the hand quiet, firm, and steady ; the heated wires, if suddenly dislodged, would assuredly burn the cheek or gums, the tongue or palate, especially if steadiness was not particularly observed on

the part of the patient. It was, I may say, only the other day, that an accident of this kind happened to a lady, in whose tooth I was applying the cautery ; she suddenly turned her head, from some cause, when the heated wire touched the internal surface of the cheek. It may be observed, however, that so rapidly can the disconnection of the wires be accomplished by removal of the finger from the handle of the instrument which is held in the hand, that an accident can really very seldom occur from the heated wire.

Having thus considered the history of the use of the electric cautery in general surgery, its application to dentistry, the nature of the apparatus employed, and the general features of the operation, together with its effects and results, I shall in the next place make a few observations upon the cases which are suitable, and upon those which are unfitted for its use ; and will then draw a comparison between the use of the cautery and other methods of destroying the pulp.

OF THE OPERATION IN PARTICULAR.

The great object of this operation, which I am endeavouring so strongly to recommend in the present communication, is to destroy the irritable ulcer in the membrane of the tooth which permits the nerve to be exposed, and which is often associated with the presence and even protrusion of minute granulations, not dissimilar to what the surgeon meets with as protruding from an ulcer situated over a carious or necrosed bone in some other part of the body. This condition is accompanied with a certain amount of inflammation and tumefaction. The cautery, as I have said before, completely destroys the affected parts, and there is no time left to produce a new surface ; nor do I think that could be accomplished after the destruction of the pulp ; nor, again, is it a necessary measure, as no particular good could be derived from it, were it to be permitted to occur.

The cavity is at once plugged and the admission of air to the tooth prevented, and the sensitiveness and carious condition are permanently removed.

Now of the PROPER CASES in which the electric cautery may be used, the most important and common is that known as severe ordinary toothache, especially that form of tooth affection arising from a cavity with exposure of the tooth-pulp. In cases also of cavities requiring filling, in which too great a sensitiveness is present, thus preventing the satisfactory removal of the carious portions of the tooth, it is equally valuable. It is useful also in cases where the gums have receded, with exposure of a part of the neck of a tooth, which is extremely sensitive and oftentimes very painful to the touch; in these it is necessary merely to touch the exposed necks, to remove the sensitiveness. It is not less serviceable in its application to tender, sensitive, and bleeding gums, producing a new and healthy action, which permits them to become firmly

attached again to the necks of the previously-exposed teeth. Sometimes it is merely necessary to hold the heated wire near a sensitive neck, without actual contract, to remove the tenderness. I have destroyed, with the greatest ease and rapidity, the pulps of incisor teeth which have been cut off for the purpose of being pivoted. Every dentist is aware of the sensitiveness which sometimes exists in a pivoted incisor tooth, depending upon the vitality of the stump; this is completely obviated by the use of the cautery. I have employed it also in numberless instances in which unusual sensitiveness exists to both warm and cold substances, depending upon a variety of causes: such as exposure of the necks; or arising from chipping and fracture of the tooth from brittleness or some other cause; or, again, where the tooth has been filed, cut, or accidentally broken. A very striking instance of this kind—that is, unusually great suffering from taking either warm

or cold liquids into the mouth—came under my care but the other day, in which permanent and complete relief was afforded from the electric cautery. If a tooth is snapped off at the neck, and the pulp-cavity becomes exposed and painful, it can be destroyed, and an artificial tooth may be fastened to the stump, in the same manner as when the tooth is intentionally removed for this purpose. Sometimes, also, bleeding will occur from the rupture of some minute capillary vessels during the removal of caries from a cavity which may have become morbidly vascular, without the presence of actual pain or even sensitiveness; it is equally serviceable here as in other forms of disease, and stops the hæmorrhage, which is inconvenient and troublesome, from its interference with the progress of stopping the tooth. I have also applied it in sensitiveness arising from the wearing away or grooving of a tooth, from the constant pressure of the spring clasp of a plate, which has caused

the destruction of the dentine ; mechanical friction, in fact, producing this condition.

As a general rule, the electric cautery may be used with decided advantage in almost every case of diseased tooth, with very few exceptions. But the commonest affection **CONSTANTLY** requiring its use, I again repeat, is ordinary **TOOTHACHE**, not unfrequently most agonizing in its character, and depending upon the presence of a cavity from caries, which has laid bare the delicate nervous pulp contained in it, which, so long as it is likely to come into contact with the liquids and solids of the mouth, will continue in this condition. Destruction of the pulp and subsequent stopping prove the remedy ; the nerve is destroyed, the pain disappears, and the tooth remains for years, and answers as well as if it had been filled without exposure and destruction of the pulp.

The electric cautery therefore saves many a tooth which, without its aid, would be otherwise

totally lost. It is preserved for years, and perhaps it is not saying too much, that if ordinary care and precaution are used, it will most probably last the life-time of the individual. This, perhaps, may seem to be problematical, as many dentists would declare that, if the nerve is destroyed, the tooth is dead ; it is a foreign body, and will last but a few years, ultimately decay, and require extraction. The cautery certainly destroys either a portion or the whole of the dental or nervous pulp ; I will say, for argument's sake, that it does completely and effectually destroy the nerve of the tooth. The tooth, however, receives nourishment from the periostium covering its fang, as well as from that lining its socket, and it would seem that there may even be minute nervous twigs accompanying the equally minute capillary bloodvessels which afford life and sustenance to the plugged tooth. It cannot therefore be looked upon as a foreign body, as it possesses and retains its

vitality, which is derived through its fang, or, in other words, from without, and is thus capable, from the reasons mentioned, of lasting with proper care, the patient's lifetime. Mr. Nasmyth has beautifully shown that a tooth is supplied with a large number of minute nervous twigs and bloodvessels.

I must also speak of another form of affection which has been relieved by it, namely, neuralgia of the face—a form of *tic douloureux*, supposed to depend upon some other cause than a carious tooth. On examining the mouth, however, I have detected an affected tooth, on destroying the pulp of which with the cauter, and subsequently stopping it, a permanent cure has been effected.

It may be recommended as admirably suited to destroy fungous growths springing from the internal pulp, which often bleed very profusely on the slightest touch.

It will thus be seen that the application of

the electric cautery is wide and extensive, in the number and variety of the cases of tooth disease.

The following, however, ARE UNFIT FOR IT, as it would not only produce no good, but harm might result from its use :—

When a tooth is loose, with its external aspect sound, but the pain depending upon the presence of a fungous growth or small abscess developed at the end of one or more of the fangs. In such a case extraction only will afford relief.

It will prove of no avail, in an attack of inflammation of the central pulp, which may sometimes affect a tooth that is otherwise apparently sound. This may be known by the severe, heavy, throbbing pain which it occasions, running up to the head, accompanied with considerable tenderness of the tooth and the gum around it. This condition may go on to suppuration of the pulp, or to abscess of the alveolus, and consequent death of the tooth. Leeches are here useful conjoined with some slight constitutional treatment.

And, lastly, when we find a black, unsightly tooth lying loose in its socket, with pain depending upon the irritation produced by its presence, the cautery will be ineffectual, as the tooth is in a true state of necrosis, is quite dead, and has truly become a foreign body ; it must therefore be removed. This condition I have not unfrequently seen to depend upon the use or abuse of mercury.

If a COMPARISON be now instituted between the electric cautery, as I am in the habit of employing it for destroying the tooth-pulp, and the numerous other means recommended to effect the same purpose, it will be seen that the balance of my confirmed judgment is entirely in favour of the former. Thus the great advantage of the cautery is, that the desired effect is produced in less time than a minute ; whilst it takes days, and even months, to accomplish destruction of the pulp by the various substances habitually in use : amongst these may

be mentioned arsenic, used either alone or in combination with other substances, as, for instance, a mixture of equal parts of arsenic, morphine, and creosote ; chloride of zinc, in the solid form, or a combination of it and chloroform ; cobalt, chloroform, creosote, gun-cotton, tannin, and tannate of lead. Nitrate of silver is used ; or nitric acid on a gold wire. Many other substances are employed. The nausea produced by the use of chloride of zinc, or nitrate of silver, is particularly disagreeable. I have, however, the strongest objection to the use of arsenic, more so than to any other substance ; and it is not without much thought on the subject, that I have come to the conclusion that it ought not to be employed in dental surgery. I have known instances in which this agent has been used, and the most acute and severe pain—in fact, absolute torture—has followed for several days, before stopping the cavity could be accomplished. Besides the pain, there is also the danger arising

from its absorption. A few months ago a case of fatal poisoning appeared in the journals, which depended upon its absorption after employment in a dental operation. Added to the time required to destroy a tooth-pulp by these various substances, there is also the mischief caused by their local application to the teeth themselves, which should not be lost sight of in the consideration of this question.

CONCLUSIONS.—I have now been in the habit of employing the electric cautery for upwards of six years, and during that time have used it in more than five thousand instances, with an amount of success that has surpassed my most sanguine expectations, and without the occurrence of a single accident worthy of mention. I may truly say, that there are very few cases of tooth-ache which cannot be relieved by it, when the membrane or tooth-pulp can be got at to destroy it. These very few cases are the exceptional in-

stances which have already been referred to. It has been held by writers on diseases of the teeth, that the impossibility of instantaneously effecting the absolute destruction of the tooth-pulp in such as are situated at the back of the mouth, which possess several diverging roots, is a sufficient ground for rejecting the means which were employed for that purpose—namely, the heating of a wire, in the form of the actual cautery, which cannot at any time be maintained at a white heat. It was in consequence of this very great difficulty that the actual cautery has fallen into disuse. Now the advantage which the electric cautery has over every other conceivable method is, that the white heat produced, and which cannot be obtained in any other manner, effects the purpose desired suddenly and with completeness. Besides this, it can be applied with perfect ease and freedom to teeth situated in any part of the mouth without the risk or danger of burning it—a risk almost impossible to avoid,

with the greatest care, when the actual cautery or heated iron was employed.

It might be supposed, again, that some imaginary terror is likely to be excited in the patient's mind, at the idea of the electric cautery, in the shape of an incandescent body being used for any purpose in the mouth. I can truly say, that in the large amount of experience of its use which has fallen to my lot, that there is not the slightest ground for such a supposition. If this be an objection to its employment, then it falls to the ground, for I can call to mind no instance where this fear was manifested. Sometimes, as has been before mentioned, the wire is introduced already heated into the mouth, when being applied to the tooth.

At one time much dread of the actual cautery arose, from the burning of the mouth by the heated handle of the instrument, which was unavoidably employed to keep the wire hot, and this occasioned, we believe, its comparative re-

jection in this country. With the electric cautery such accidents are avoided ; I may say, they scarcely ever occur, in the hands of any ordinarily skilful man, for, owing to the extreme fineness of the wire employed, the local heat, though intense, is very limited in its action, and with due care the tooth substance need not suffer any appreciable injury. For the same reason, with the additional and more powerful one, of suddenly breaking the connection between the poles of the battery, no injury can happen to the month or gums.

Such, then, are the uses and advantages of this valuable agent in dental practice, and so well known is it becoming to a large number of the public, that a considerable proportion of my patients come recommended to me by medical men and others, for the express purpose of cauterization by it.

In March, a lady, to two of whose teeth I applied it instead of extracting them, writes to

me, "Neither of my teeth have given me the least uneasiness. I am sure I have much to thank you for. Now, one need not fear the approach of toothache; we are so much more favoured than those who lived a hundred years ago." These two teeth were, I may observe cauterized and stopped at the same sitting.

I can now with still greater confidence, and much larger experience, lay this most valuable and efficient remedy before the notice of my professional brethren than I did in 1851. Very many years' constant trial have only further convinced me, that for ingenuity, simplicity of contrivance and application, nothing that has hitherto been invented can surpass it. And I again confidently leave it in their hands, gladly availing myself of my connection with the College of Dentists, as one of its members, as a medium of doing so.

C. JAKES, Printer, Kenton Street, Brunswick Square.







